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Saturated nucleate pool boiling of oxygen under magnetically-enhanced effective gravity[1] T. A. CORCOVILOS[2], M. E. TURK[3], California Institute of Technology - Division of Physics, Math, and Astronomy, Pasadena, CA, USA, D. M. STRAYER, California Institute of Technology - Jet Propulsion Laboratory, Pasadena, CA, USA, N. N. ASPLUND, N.-C. YEH, California Institute of Technology - Division of Physics, Math, and Astronomy, Pasadena, CA, USA —
We investigate the effect of enhancing gravity on saturated nucleate pool boiling of oxygen for effective gravities (g_{eff}) of $1g$, $6g$, and $16g$ ($g = 9.8$ ms^{-2}) at a saturation pressure of 760 torr and for heat fluxes of $10 \sim 3000$ Wm^{-2}. The effective gravity on the oxygen is increased by applying a magnetic body force generated by a superconducting solenoid. We measure the heater temperature (expressed as a reduced superheat) as a function of heat flux and fit this data to a piecewise power-law/linear boiling curve. At low heat flux ($\lesssim 400$ Wm^{-2}) the superheat is proportional to the cube root of the heat flux. At higher heat fluxes, the superheat is a linear function of the heat flux. The value of the transition heat flux separating these two regions is proportional to $g_{\text{eff}}^{0.25}$, indicating a possible link to the critical heat flux.

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